EFFECT OF WEATHER ON CROPS AND FARMING OPERATIONS, JULY, 1922.

By J. B. KINCER, Meteorologist.

July, 1922, was on the whole favorable for farming operations in most sections of the country, although the first half of the month was rather too cool for warm-weather crops in the more northern States, and moisture was markedly deficient during most of the month in the Southwest. In addition, the latter part of the month was excessively warm in the lower Great Plains section, where moisture was deficient, and in some localities of that area destructive hot winds were experienced. Farm work made good progress generally, except for some delay to harvest in north-central States caused by heavy rainfall, and some hindrance to field work in the Southeast by continued wet soil.

Harvest and threshing of small grains made good progress under favorable weather conditions in practically all of the principal producing areas, and the weather was generally favorable for drying grain in shock, except that considerable damage occurred to oats in parts of the upper Mississippi Valley because of molding, rotting, and sprouting. Spring grains were benefited by showers in many of the more western districts the latter part of the month.

Temperature and moisture conditions were favorable for corn in the central valley States, except for some lack of moisture in parts of the Ohio Valley. It was rather cool for this crop during much of the month, however, in the central Northern States, and there was a serious lack of moisture in Oklahoma and central and western Texas and late corn deteriorated in that area. The rainfall near the close of the month in much of the upper Mississippi Valley was very favorable for corn.

The weather was mostly favorable for cotton, except where there was a lack of moisture in the more western portions of the belt and where it was too wet in parts of the east. The drought in Texas and Oklahoma had become rather serious at the close of the month and the progress of cotton was poor to only fair and considerable wilting and shedding were reported. Weevil, however, had become generally less active, particularly in the western portion of the belt where the weather had been warm and dry, although they continued numerous in most sections and were doing much damage in many localities. The weather was very favorable for picking in southern Texas, and bolls were reported as opening rapidly in southern Georgia at the close of the month.

There was sufficient moisture for most truck crops in the Central and Eastern States, but rain was badly needed in the Southwest, and moisture was deficient during parts of the month in portions of the Ohio Valley.

Grasses and ranges were rather unfavorably affected by dryness in the central Rocky Mountain States, although considerable rain fell in this area the latter part of the month, and at the same time showers improved the range in the northern and northwestern Great Plains. Ranges were very unfavorably affected by continued dry weather in the Southwest, although there was some relief by showers near the close of the month in much of Arizona and parts of New Mexico. Droughty conditions continued in the far Northwestern States.

CLIMATOLOGICAL TABLES.

DESCRIPTION OF TABLES AND CHARTS.

Table I gives the data ordinarily needed for climatological studies for about 176 Weather Bureau stations making simultaneous observations at 8 a. m. and 8 p. m. daily, 75th meridian time, and for about 37 others making only one observation. The altitudes of the instruments above ground are also given.

Table II gives, for about 35 stations of the Canadian Meteorological Service, the means of pressure and temperature, total precipitation, and depth of snowfall, and the respective departures from normal values except in the case of snowfall. The sea-level pressures have been computed according to the method described by Prof. F. H. Bigelow in the REVIEW of January, 1902, pages 13–16.

Chart I.—*Tracks of centers* of ANTICYCLONES; and

Chart II.—*Tracks of centers* of CYCLONES. The Roman numerals show the chronological order of the centers. The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the observations at 8 a. m. and 8 p. m., 75th meridian time. Within each circle is also given (Chart I) the last three figures of the highest barometric reading, or (Chart II) the lowest reading reported at or near the center at that time, and in both cases as reduced to sea-level and standard gravity. The inset map in Chart I shows the departure of monthly mean pressure from normal and the inset in Chart II shows the change in mean pressure from the preceding month.

Chart III.—*Temperature departures.* This chart presents the departures of the monthly mean surface temperatures from the monthly normals. The shaded portions of the chart indicate areas of positive departures and unshaded portions indicate areas of negative departures. Generalized lines connect places having approximately equal departures of like sign. This chart of monthly surface temperature departures in the United States was first published in the MONTHLY WEATHER REVIEW for July, 1909.

Chart IV.—*Total precipitation.* The scale of shades showing the depth is given on the chart. Where the monthly amounts are too small to justify shading and over sections of the country where stations are too widely separated, or the topography is too diversified to warrant reasonable accuracy in shading, the actual depths are given for a limited number of representative stations. Amounts less than 0.005 inch are indicated by the letter T, and no precipitation by 0.00. The inset on this chart shows the departure of the monthly totals from the corresponding normals.

Chart V.—*Percentage of clear sky between sunrise and sunset.* The average cloudiness at each Weather Bureau station is determined by numerous personal observations between sunrise and sunset. The difference between the observed cloudiness and 100 is assumed to represent the percentage of clear sky, and the values thus obtained are the basis of this chart. The chart does not relate to the nighttime.

Chart VI.—*Isobars at sea level, average surface temperatures, and prevailing wind directions.* The pressures have been reduced to sea level and standard gravity by the method described by Prof. Frank H. Bigelow on pages 13–16 of the REVIEW for January, 1902. The pressures have also been reduced to the mean of the 24 hours by the application of a suitable correction to the mean of 8 a. m.—and 8 p. m.—readings at stations taking two observations daily, and to the 8 a. m.—or the 8 p. m.—observation, respectively, at stations taking but

a single observation. The diurnal corrections so applied will be found in the Annual Report of the Chief of the Weather Bureau, 1900–1901, volume 2, Table 27, pages 140–164.

The sea level temperatures are now omitted and average surface temperatures substituted. The isotherms can not be drawn in such detail as might be desired, for data from only the regular Weather Bureau stations are used.

The prevailing wind directions are determined from hourly observations at the great majority of the stations. A few stations having no self-recording wind-direction apparatus determine the prevailing direction from the daily or twice-daily observations only.

Chart VII.—*Total snowfall.* This is based on the reports from regular and cooperative observers and shows the depth in inches of the snowfall during the month. In general, the depth is shown by lines inclosing areas of equal snowfall, but in special cases figures are also given.

Chart VII is published only when the snowfall is sufficiently extensive to justify its preparation.

Charts VIII, IX, etc.—*North Atlantic weather maps of particular days.*

CONDENSED CLIMATOLOGICAL SUMMARY.[1]

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Condensed climatological summary of temperature and precipitation by sections, July, 1922.

Section.	Temperature.								Precipitation.					
			Monthly extremes.								Greatest monthly.		Least monthly.	
	Section average.	Departure from the normal.	Station.	Highest.	Date.	Station.	Lowest.	Date.	Section average.	Departure from the normal.	Station.	Amount.	Station.	Amount.
	°F.	°F.		°F.			°F.		In.	In.		In.		In.
Alabama	79.9	0.0	Madison	100	[2] 27	Riverton	53	5	4.29	−1.06	Spring Hill	12.85	Wetumpka	1.76
Arizona	81.5	+1.6	Parker	119	6	Alpine	39	28	1.79	−0.69	Douglas	6.29	Yuma Citrus Station	0.00
Arkansas	80.2	+0.3	Subiaco	106	31	2 stations	48	5	4.12	+0.20	Marked Tree	8.90	Mena	0.96
California	73.4	+0.2	Greenland Ranch	126	15	Portola	28	22	0.15	+0.07	Campo	7.10	114 stations	0.00
Colorado	66.3	+3.5	Two Buttes	105	16	2 stations	27	[2] 7	1.88	−0.33	Wray	5.15	Delta	0.04
Florida	80.7	−0.4	Orlando	101	31	De Funiak Springs	57	7	6.84	−0.89	Pinellas Park	16.02	Sand Key	1.68
Georgia	80.3	+0.2	2 stations	101	[2] 29	Blue Ridge	57	6	4.96	−0.81	Clayton	10.04	Albany	1.60
Hawaii														
Idaho	68.0	+1.1	Kooskia	113	30	Stanley	25	16	0.49	−0.26	Grace	2.11	Lapwai	0.00
Illinois	75.0	−0.9	2 stations	102	[2] 27	Sycamore	41	8	3.69	+0.25	Freeport	8.00	La Salle	1.20
Indiana	74.2	−1.1	Seymour	101	16	2 stations	43	[2] 4	3.49	+0.04	Jeffersonville	9.05	Kokomo	0.80
Iowa	71.5	−2.6	Burlington	98	9	Estherville	40	7	6.31	+2.35	Mount Ayr	11.72	Northwood	3.13
Kansas	77.0	−1.1	Atwood	109	15	Oakley	42	7	5.07	+1.49	Winfield	13.62	Scott City	0.71
Kentucky	76.4	−0.3	Paducah	102	[2] 28	2 stations	47	5	4.77	+0.47	Cherokee Park	9.06	Maysville	1.55
Louisiana	81.4	−0.4	Plain Dealing	103	31	Calhoun	52	5	5.85	−0.46	Schriever	12.25	Calhoun	2.34
Maryland-Delaware	74.7	−0.4	2 stations	99	11	2 stations	43	6	5.82	+1.37	Cambridge, Md	11.78	Western Port, Md	1.83
Michigan	67.1	−1.4	Pontiac	100	24	Houghton Lake (near)	29	4	3.82	+0.71	Escanaba	7.37	Pontiac	0.48
Minnesota	67.3	−1.7	Fergus Falls	100	14	2 stations	38	3	2.26	−1.40	Grand Marais	5.35	Milaca	0.40
Mississippi	80.5	−0.2	5 stations	101	[2] 12	Edinburg	53	5	4.64	−0.42	Hickory	10.35	Agricultural College	1.32
Missouri	76.8	−0.7	Caruthersville	103	[2] 24	Goodland (2)	46	4	5.85	+1.82	Grant City	17.68	St. Louis (No. 2)	1.92
Montana	65.8	−0.4	Glendive	103	19	Philipsburg	29	13	1.73	+0.48	Wibaux	4.45	Fortine	0.34
Nebraska	72.6	−2.0	2 stations	106	[2] 14	Gordon	35	12	4.54	+1.10	Blair	9.08	Kimball	1.08
Nevada	74.1	+1.1	Logandale	116	5	Rye Patch	33	26	0.54	+0.19	Lamoille	1.80	Arthur	0.00
New England	68.4	−0.5	Torrington, Conn	95	13	Garfield, Vt	36	30	3.33	−0.29	Lawrence, Mass	7.17	Burlington, Vt	0.98
New Jersey	73.0	−0.7	Sussex	98	12	Layton	44	30	5.79	+1.00	Plainfield	9.26	Trenton	2.29
New Mexico	74.0	+1.3	Orogrande	110	[2] 11	Chama	30	[2] 9	1.32	−1.25	Aurora	4.59	Lindrith	0.00
New York	69.1	−0.5	Dansville	100	12	3 stations	37	[2] 10	3.29	−0.63	Bedford Hills	12.40	Copenhagen	0.63
North Carolina	76.8	+0.5	Goldsboro	100	1	3 stations	50	[2] 6	6.97	+1.05	Eagletown	12.52	Cullowhee	2.40
North Dakota	65.6	−1.9	Napoleon	100	14	Napoleon	30	7	2.40	−0.21	Larimore	6.15	Walhalla	0.60
Ohio	72.9	−0.9	Green	99	27	Wooster	41	5	3.70	−0.15	Hillsboro	8.45	Wauseon	1.25
Oklahoma	81.7	+0.7	Frederick	112	31	Arapoho	50	4	4.08	+0.97	Vinita	9.85	Mangum	0.44
Oregon	68.3	+2.3	Umatilla	114	3	Lapine	21	23	0.05	−0.52	2 stations	0.59	60 stations	0.00
Pennsylvania	71.9	−0.2	5 stations	98	[2] 11	West Bingham	38	30	3.68	−0.53	Springdale	7.58	West Bingham	1.45
South Carolina	79.9	+0.1	2 stations	101	[2] 2	2 stations	58	6	7.20	+1.22	Society Hill	12.58	Parris Island	3.59
South Dakota	69.2	−1.7	Pollock	104	14	Pollock	33	7	3.86	+0.55	Kadoka	8.82	Britton	0.44
Tennessee	77.4	−0.1	Perryville	101	28	Waynesboro	48	5	5.58	+0.86	Cedar Hill	10.56	Loretto	1.05
Texas	83.4	+0.5	3 stations	110	[2] 21	3 stations	53	[2] 4	1.74	−0.99	Beaumont	10.16	6 stations	0.00
Utah	71.6	+0.9	St. George	112	15	East Portal	32	2	0.75	−0.17	Farmington	2.16	Black Rock	0.00
Virginia	75.3	−0.2	Chatham	99	2	Burkes Garden	48	7	6.66	+2.22	Newport News	10.25	Manassas	2.20
Washington	67.7	+1.7	2 stations	111	3	Paradise Inn	32	24	0.03	−0.72	Locke	0.61	88 stations	0.00
West Virginia	72.9	−0.1	Wheeling	99	12	Bayard	43	6	4.53	−0.19	Cheat Bridge	8.05	Dam 26, Ohio River	1.16
Wisconsin	67.1	−2.1	Beloit	99	9	Grantsburg	31	28	3.86	+0.22	New London	7.68	Amery	1.39
Wyoming	64.1	−0.9	3 stations	102	[2] 14	Foxpark	21	12	1.59	+0.24	Newcastle	5.78	Green River	0.01

[1] For description of tables and charts, see REVIEW, January, 1921, p. 41.

[2] Other dates also.